

Absolute Value problems

1. Solve $|x + 5| = 19$
2. Solve $|x - 5| = 7$
3. Solve $|x - 9| = 1$
4. Solve $|2x + 5| = 0$
5. Solve $|2x - 3| = 10$
6. Solve $|5x - 6| = -2$
7. Solve $|x + 5| + 9 = 19$
8. Solve $|x - 8| + 8 = 11$
9. Solve $|2x - 4| - 5 = -2$
10. Solve $|5x + 3| + 16 = 8$
11. Solve $|x - 7| = |x - 5|$
12. Solve $|x + 7| = |x + 5|$
13. Solve $|x - 9| = |x + 3|$
14. Solve $|x + 12| = |x - 12|$
15. Solve $|2x - 7| = |x - 5|$
16. Solve $|2x + 7| = 2|x + 5|$
17. Solve $|2x - 9| = |x + 3|$
18. Solve $|2x + 12| = 3|x - 12|$
19. Solve $|5x - 7| = |x - 5|$
20. Solve $|5x + 7| = |x + 5|$
21. Solve $|5x - 9| = 4|x + 3|$
22. Solve $|5x + 12| = |x - 12|$
23. Solve $|2x - 7| = |3x - 5|$
24. Solve $|2x + 7| + |3x + 5| = 19$
25. Solve $|2x - 9| - |3x + 3| = 2$
26. Solve $|2x + 12| = |3x - 12|$
27. Solve $|2x - 7| + 9 = |3x - 5| - 3$
28. Solve $|2x + 7| - 8 = -2|3x + 5| - 1$
29. Solve $|2x - 9| + 4 + |3x + 3| = 12$
30. Solve $|2x + 12| - 2 = |3x - 12| + 1$
31. Solve $|x + 5| < 19$
32. Solve $|x - 5| > 7$
33. Solve $|x - 9| \leq 1$
34. Solve $|2x + 5| \geq 0$
35. Solve $|2x - 3| < 10$
36. Solve $|5x - 6| > -2$
37. Solve $|x + 5| + 9 \leq 19$
38. Solve $|x - 8| + 8 \geq 11$
39. Solve $|2x - 4| - 5 < -2$
40. Solve $|5x + 3| + 16 > 8$
41. Solve $|x - 7| \leq |x - 5|$
42. Solve $|x + 7| \geq |x + 5|$
43. Solve $|x - 9| < |x + 3|$
44. Solve $|x + 12| > |x - 12|$
45. Solve $|2x - 7| \leq |x - 5|$
46. Solve $|2x + 7| \geq |x + 5|$
47. Solve $|2x - 9| < |x + 3|$
48. Solve $|2x + 12| > |x - 12|$
49. Solve $|5x - 7| \leq |x - 5|$
50. Solve $|5x + 7| \geq 2|x + 5|$
51. Solve $|5x - 9| < |x + 3|$
52. Solve $|5x + 12| > 3|x - 12|$
53. Solve $|2x - 7| \leq |3x - 5|$
54. Solve $|2x + 7| \geq |3x + 5|$
55. Solve $|2x - 9| < 4|3x + 3|$
56. Solve $|2x + 12| + |3x - 12| > 17$
57. Solve $|2x - 7| + 9 - |3x - 5| < -3$
58. Solve $|2x + 7| - 8 > -|3x + 5| - 1$
59. Solve $|2x - 9| + 4 + |3x + 3| \leq 12$
60. Solve $|2x + 12| - 2 \geq |3x - 12| + 1$

61. Two existing train stations A and B are 80km and 130km respectively from the terminus. A transport company is planning to build another station but is restricted as to where it can build by existing contracts. The distance from station B must be less than half the distance from station A.
- (a) Using x to represent distance in kilometres from the terminus, write an expression representing the distance from A.
 - (b) Using x to represent distance in kilometres from the terminus, write an expression representing the distance from B.
 - (c) Using x to represent distance in kilometres from the terminus, write an inequality to represent the restriction on where the new station can be built.
 - (d) Which of the following positions for the station satisfy the restriction?
 - i. $x = 40$
 - ii. $x = 90$
 - iii. $x = 105$
 - iv. $x = 120$
 - v. $x = 150$
 - vi. $x = 200$
 - (e) Solve the inequality algebraically.
 - (f) Interpret your answer in terms of where the new station might be built.
62. The positions of trucks A, B and C along the highway at time t are given by $80t + 20$, $95t$ and $100t + 40$. Assuming all trucks drive continuously for ten hours (i.e. $0 \leq t \leq 10$),
- (a) For what values of t is the distance between truck A and truck B less than 5km?
 - (b) For what values of t is the distance between truck B and truck C less than 5km?
 - (c) For what values of t is the distance between truck A and truck B less than the distance between truck B and truck C?